DaimlerChrysler AG

Claims

1. Device for preventing roll in a vehicle, comprising a detection device (10) which determines an actual value ($\dot{\psi}_{actual}$) of a yaw rate variable describing the yaw rate of the vehicle, an evaluation unit (11) which determines a setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable and a threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable that is suitable for limiting the setpoint value ($\dot{\psi}_{setpoint}$) for avoiding rollover of the vehicle, and a control device (12) for controlling vehicle units (13) provided for influencing the longitudinal and/or transversal dynamics of the vehicle, and the evaluation unit (11) controls the vehicle units (13), based on a comparison between the determined actual value ($\dot{\psi}_{actual}$) of the yaw rate variable and the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable, in such a way that the determined actual value ($\dot{\psi}_{actual}$) of the yaw rate variable assumes the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable, whereby in the event that the setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable exceeds the threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable, to avoid rollover of the vehicle the evaluation unit (11) limits the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable to the determined threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable,
characterized in that

the evaluation unit (11) determines the threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable as a function of a threshold value ($\varphi_{threshold}$) of a roll angle variable (φ) which describes a roll angle of the vehicle.

2. Device according to Claim 1,
characterized in that
the threshold value ($\varphi_{threshold}$) of the roll angle variable determined by the evaluation unit (11) characterizes a transition between a roll-stable state and a rolling state of the vehicle.

3 Device according to Claim 1,
characterized in that
the evaluation unit (11) determines the setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable as a function of a determined steering angle variable (δ) which describes the steering angle which can be set at the steerable wheels of the vehicle, and/or as a function of a longitudinal speed variable (v_f) which describes the longitudinal speed of the vehicle.

4. Device according to Claim 1,
characterized in that
the evaluation unit (11) determines the threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable as a function of variables that characterize the load state and/or geometric characteristics and/or body characteristics of the vehicle.

5. Device according to Claim 4,
characterized in that
the variables that characterize the load state of the vehicle include a position of center of gravity variable (h_{sp}) which describes the spatial location of the center of gravity of the vehicle, and/or a mass variable (m_f) which describes the mass of the vehicle.

6. Device according to Claim 4,
characterized in that
the variables that characterize the geometric characteristics of the vehicle include a track width variable (s_f) which describes the track

width of the vehicle, and/or a position of center of roll variable (h_w) which describes the location of the center of roll of the vehicle.

7. Device according to Claim 4,
characterized in that
the variables that characterize the body characteristics of the vehicle include a roll resistance variable (c_φ) which describes the roll resistance of the body of the vehicle.

8. Device according to Claim 5,
characterized in that
the evaluation unit (11) determines the position of center of gravity variable (h_{sp}) and/or the mass variable (m_f) while and/or before the vehicle starts to travel.

9. Device according to Claim 5,
characterized in that
the evaluation unit (11) determines the position of center of gravity variable (h_{sp}) and/or the mass variable (m_f) as a function of variables that characterize the state of motion of the vehicle, and/or as a function of the temporal response of at least one of these variables.

10. Device according to Claim 9,
characterized in that
the variables that characterize the state of motion of the vehicle include a tipping angle variable which describes the tipping angle of the vehicle, and/or a pitch angle variable which describes the pitch angle of the vehicle.

11. Device according to Claim 5,
characterized in that
in each case a fixed, predetermined value for the position of center of

gravity variable (h_{sp}) and/or the mass variable (m_f) is stored in the evaluation unit (11).

12. Device according to Claim 1,
characterized in that
the evaluation unit (11) determines the threshold value ($\varphi_{threshold}$) of the roll angle variable as a function of variables that characterize the transverse dynamics of the vehicle.

13. Device according to Claim 12,
characterized in that
the variables that characterize the transverse dynamics of the vehicle include a transverse acceleration variable (a_q) which describes the transverse acceleration acting on the vehicle.

14. Device according to Claim 1,
characterized in that
the vehicle units (13) are drive means (13a) for providing propulsion which acts on the vehicle, and/or braking means (13b) for braking the wheels of the vehicle, and/or steering means (13)c for influencing the steering of the vehicle.

15. Device according to Claim 14,
characterized in that
the braking means (13b) is designed so that the wheels of the vehicle may each be braked independently.

16. Device according to Claim 1,
characterized in that
the detection device (10), evaluation unit (11), and control device (12) are components of an electronic stability program present in the vehicle.

17. Device according to Claim 1,
characterized in that
the evaluation unit (11) provides controllable driver information means (23) for sending optical and/or acoustic driver information, and the evaluation unit (11) causes the optical and/or acoustic driver information to be sent in conjunction with the control of the vehicle units (13).

18. Method for preventing roll in a vehicle, in which an actual value ($\dot{\psi}_{actual}$) of a yaw rate variable describing the yaw rate of the vehicle is determined, and a setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable and a threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable are determined, and based on a comparison between the determined actual value ($\dot{\psi}_{actual}$) of the yaw rate variable and the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable the longitudinal and/or transversal dynamics of the vehicle are influenced in such a way that the determined actual value ($\dot{\psi}_{actual}$) of the yaw rate variable assumes the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable, whereby in the event that the setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable exceeds the threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable, to avoid rollover of the vehicle the determined setpoint value ($\dot{\psi}_{setpoint}$) of the yaw rate variable is limited to the determined threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable,
characterized in that
the threshold value ($\dot{\psi}_{threshold}$) of the yaw rate variable is determined as a function of a threshold value ($\varphi_{threshold}$) of a roll angle variable (φ) which describes a roll angle of the vehicle.